# Mathematics, grade 2

All units for this subject and grade (unreviewed AI drafts)

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# Grade 2 Mathematics: Adding and Taking Away Within 100 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Adding and taking away within 20 and Tens and ones to 100

## Big idea

Two-digit numbers are tens and ones, so we can add or take away tens with tens and ones with ones. Sometimes ten ones join to make a new ten, and sometimes a ten has to be broken into ten ones. Adding and taking away undo each other, so one can check the other. A drawing with a box for the unknown helps us see what a story problem is asking, even when it has two steps.

## Outcomes

By the end of the unit most children can:

1. Add and take away within 20 quickly using a strategy they can name (doubles, near doubles, making ten, or "what do I add?").
2. Add two two-digit numbers by adding tens and tens and ones and ones, using cubes, drawings or the hundred square, including sums where the ones make a new ten (38 + 25 = 63).
3. Take away a two-digit number from a two-digit number, including when a ten has to be broken into ones (52 - 17 = 35), and check the answer by adding.
4. Explain with cubes or a drawing why their method works ("8 ones and 5 ones are 13 ones, which is 1 ten and 3 ones").
5. Solve one-step story problems within 100 of the five kinds (adding to, taking from, putting together, taking apart, comparing), and two-step story problems, using a drawing and a number sentence with a box for the unknown.

## Prior knowledge

The grade 1 units: facts within 20 with strategies (fluency within 10 only), tens and ones to 100, 10 more and 10 less, adding a one-digit number or a multiple of ten to a two-digit number. Children still building these can work with numbers to 50, or with sums that do not make a new ten, in every lesson.

## Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work with cubes, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so each method should come back in short daily practice (5 minutes of quick facts or one story problem).

1. Facts within 20: checking and speeding up
2. Adding tens and ones
3. Adding when the ones make a new ten
4. Taking away, breaking a ten, and checking by adding
5. One-step and two-step story problems

## Materials (whole class unless noted)

- Linking cubes too large to swallow, per pair: 10 towers of ten and 20 loose cubes (lessons 2 to 5). Straw bundles of ten wrapped with tape (no rubber bands, which may contain latex) work as well.
- Two ten-frames and 20 counters per child (lesson 1), in two colours or two kinds of object so colour is not the only clue.
- A tens-and-ones mat per pair: a sheet with a left column for tens and a right column for ones, with a raised line (glued string) between them (lessons 2 to 5).
- A 1 to 100 hundred square per pair, in large print, with optional raised lines between rows (lessons 2 and 4); one large hundred square for the board.
- Fact cards and four strategy cards (double, near double, make ten, what do I add?) per pair for lesson 1 (see lesson 1).
- Optional: a cup marked "ten" per pair (lesson 3, for children who slide ten loose cubes into it instead of snapping), and egg boxes or a 2 by 5 grid of cups for tactile ten-frames (lesson 1).
- Two sets of digit cards 0 to 9 per pair, so children can build and point to two-digit answers (every lesson).
- Story-problem cards for lesson 5 (see lesson 5), with a small picture on each card.
- Whiteboards and pens, or paper and pencils, for drawings and number sentences.

## ⚠ Safety and access

- Use cubes and counters too large to swallow; no rubber bands.
- Cube towers and the raised line on the mat let children who are blind or have low vision feel tens and ones; large-print or tactile hundred squares help too.
- Pointing to digit cards, moving cubes, sign, writing or a communication device all count as answers. Story problems are read aloud, so reading is not what is being checked.
- No public timing or races. "Quick" means without counting all from 1, in the child's own way.

## Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "What is 8 + 7? How did you work it out?" (15; for example 7 + 7 + 1, or 8 + 2 + 5.) "What is 13 - 5?" (8; for example "5 and what make 13?")

- "What is 43 + 25?" (68: 4 tens and 2 tens are 6 tens, 3 ones and 5 ones are 8 ones.)
- "What is 37 + 48? Show me with cubes or a drawing." (85: 7 ones and 8 ones are 15 ones, which is 1 ten and 5 ones, so 3 + 4 + 1 = 8 tens and 5 ones.)
- "What is 62 - 27? How can you check?" (35: break a ten so there are 5 tens and 12 ones, take 2 tens and 7 ones, leaving 3 tens and 5 ones; check 35 + 27 = 62.)
- "56 leaves were on a branch. The wind blew some away. Now there are 29. How many blew away?" (27; 29 + □ = 56 or 56 - 29 = □.)
- "Duck had 18 pebbles. Duck found 20 more, then gave 9 to Hen. How many pebbles does Duck have now?" (29: 18 + 20 = 38, then 38 - 9 = 29.)

Record yes, with help or not yet for each part. A child who answers correctly by counting in ones has the answer but not yet the tens-and-ones method; note that rather than marking it wrong.

## Sources

- Common Core State Standards, Grade 2 Operations and Algebraic Thinking (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/OA/
  - 2.OA.A.1 one- and two-step word problems within 100 involving adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, using drawings and equations with a symbol for the unknown; 2.OA.B.2 fluently add and subtract within 20 using mental strategies, and by the end of grade 2 know from memory all sums of two one-digit numbers.
- Common Core, Grade 2 Number and Operations in Base Ten: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/NBT/
  - 2.NBT.B.5 fluently add and subtract within 100 using strategies based on place value, properties of operations and the relationship between addition and subtraction; 2.NBT.B.6 add up to four two-digit numbers (lesson 3 stretch only); 2.NBT.B.9 explain why addition and subtraction strategies work, using place value (explanations may be supported by drawings or objects).
- Common Core, Grade 2 introduction (its critical areas include fluency with addition and subtraction within 100): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/introduction/

## Known gaps and cautions

- Peer check: Gemini 4 Argon did a script-verified text check at 6e0e80a (keys, working, timings and links; as reported, not an educator or accessibility review) and reported 0 errors (see PEERCHECKS.md).
- Knowing all sums of two one-digit numbers from memory is an end-of-year aim in the source; this unit starts that work, and the daily quick-facts practice should continue all year.
- Odd and even numbers and adding equal groups (2.OA.C.3, 2.OA.C.4) are left for term 2, where the year plan puts equal groups. Three-digit numbers and adding within 1000 are also term 2.
- Problems with the unknown at the start ("Some stamps... now there are 60") are the hardest kind and appear in lesson 5 as a stretch task.
- A written column method is not taught. Children record tens and ones in their own way (drawings of towers and cubes, or splitting numbers into tens and ones); a written method can follow once the meaning is secure.

- The names in story problems (Remy, Duck, Hen, Mouse, Goat, Bear) are the made-up Little Hill characters used in other units. Swap in names and objects that suit your class, but avoid real children's belongings or families.
- The lesson order, timings and examples are my choice, not taken from a source.

# Lesson 1: Facts within 20: checking and speeding up

Unit overview - Next: Lesson 2

About 45 minutes.

## Goal

Children recall the grade 1 strategies for facts within 20 (doubles, near doubles, making ten, "what do I add?"), choose one for a given fact, and start answering more facts without counting all from 1.

## Materials

- Two ten-frames and 20 counters per child, in two colours or two kinds of object.
- Fact cards per pair: 12 cards, each with one fact on it: 6 + 6, 7 + 8, 9 + 5, 8 + 6, 5 + 6, 9 + 9, 13 - 4, 15 - 8, 12 - 9, 17 - 8, 14 - 7, 11 - 3. Write the answer small on the back.
- Four strategy cards per pair, each with a word and a picture: double (two equal towers), near double (two towers, one cube taller), make ten (a full ten-frame), what do I add? (a question mark).
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Pairs to ten. Show 6 on a ten-frame. "How many more make 10?" (4.) Repeat with 3 (7), 8 (2), 1 (9) and 5 (5). Children answer with fingers, counters or digit cards.

### ✎ Main activity (32 min)

1. **Remember the strategies (10 min).** Work one fact of each kind on the board with ten-frames:
    - 7 + 7 = 14 (double).
    - 7 + 8 = 7 + 7 + 1 = 15 (near double).
    - 9 + 6: move 1 counter across to fill the first frame, so 10 + 5 = 15 (make ten).
    - 13 - 9: "9 and what make 13?" 9 + 1 = 10, then 3 more, so 4 (what do I add?).
2. **Sort the facts (12 min).** Pairs lay out the four strategy cards and put each fact card under the strategy they would use, then work it out and check the back. More than one place can be right (8 + 6 can be a near double, 7 + 7, or make ten, 8 + 2 + 4). Answers: 6 + 6 = 12, 7 + 8 = 15, 9 + 5 = 14, 8 + 6 = 14, 5 + 6 = 11, 9 + 9 = 18, 13 - 4 = 9, 15 - 8 = 7, 12 - 9 = 3, 17 - 8 = 9, 14 - 7 = 7, 11 - 3 = 8.
3. **Quick facts game (10 min).** Pairs shuffle the fact cards face down. One child turns a card and answers in their own way; the partner checks the back. If the answer took a

long count, the pair talks about which strategy would be quicker next time. Swap after each card. No timing and no scores.

### ✓ Discussion questions (with answers)

- Why is 7 + 8 easy if you know 7 + 7? 8 is one more than 7, so the answer is one more than 14: 15.
- For 12 - 9, why is "what do I add?" quicker than counting back 9? 9 is close to 12; adding up from 9 to 12 is just 3 steps.
- Can a fact belong to more than one strategy? Yes; any strategy that gives the right answer works.

### ✓ Closing check (8 min, with answers)

Each child answers on a whiteboard, with digit cards or by pointing: "7 + 8" (15), "14 - 6" (8; 6 and 8 make 14), "9 + 6" (15). Then one child at a time quietly tells the teacher which strategy they used for one of the three.

## Vocabulary

double, near double, make ten, fact, strategy

## Differentiation

- **Support:** stay with doubles and make ten for sums to 14, using ten-frames.
- **Stretch:** make a fact card of your own for each strategy, and explain why 6 + 8 can be solved as a double of 7 (take 1 from 8 and give it to 6: 7 + 7 = 14).
- Ten-frames can be made tactile (counters in an egg box or a 2 by 5 grid of cups). Fact cards can be read aloud by the partner or made in large print or braille.

## ⚠ Safety

Use counters too large to swallow.

## Teacher notes and misconceptions

- Some children still count all from 1. That is fine in this lesson; note who does, and give them daily make-ten and doubles practice.
- "What do I add?" is a way to think about a take-away, not a different operation. Saying both ("13 take away 9 is 4, because 9 and 4 make 13") helps.

# Lesson 2: Adding tens and ones

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

## Goal

Children add two two-digit numbers where the ones do not make a new ten, by adding tens with tens and ones with ones, using cubes, a tens-and-ones mat and the hundred square.

## Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes, a tens-and-ones mat and a hundred square.
- A large hundred square for the board.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

10 more and 10 less. Point to 47 on the big hundred square. "What is 10 more?" (57, the square below.) "10 less?" (37, the square above.) Repeat with 62 (72, 52) and 18 (28, 8).

### ✎ Main activity (30 min)

1. **Build both numbers (10 min).** On the board: 34 + 25. Build 34 (3 towers, 4 loose cubes) and 25 (2 towers, 5 loose) on the mat, towers on the tens side and loose cubes on the ones side. "Tens with tens: 3 tens and 2 tens are 5 tens. Ones with ones: 4 and 5 are 9. 5 tens and 9 ones is 59." Pairs build and add:
    - 42 + 36 (78)
    - 51 + 27 (78)
    - 23 + 45 (68)
2. **Hundred square jumps (10 min).** Show 34 + 25 on the big hundred square: start at 34, jump down 2 rows for 2 tens (44, 54), then 5 squares along for 5 ones (55, 56, 57, 58, 59). Pairs use their own squares for 23 + 45 and check it matches the cubes (68). Then 60 + 38 (98: start at 60, jump down 3 rows to 90, then 8 along to 98).
3. **Record it your own way (10 min).** Children write or draw one of their sums: drawings of towers and cubes, or splitting into tens and ones (34 + 25: 30 + 20 = 50, 4 + 5 = 9, 50 + 9 = 59). Any clear record counts.

### ✓ Discussion questions (with answers)

- Why do we put tens with tens and ones with ones? They are different sizes; 5 tens and 9 ones is 59, but adding 3 to 5 as if both were ones would give the wrong number.
- On the hundred square, why does jumping down one row add 10? Each row has ten squares, so the square below is always 10 more.
- Does 25 + 34 give the same answer as 34 + 25? Yes, 59; the order does not change the total.

### ✓ Closing check (10 min, with answers)

"Show me 32 + 46 with cubes or on the hundred square, then show the answer with digit cards." (78.) Then "14 + 53." (67.) Note who adds tens and ones and who counts every cube in ones.

## Vocabulary

tens, ones, tower, loose cubes, hundred square, row

## Differentiation

- **Support:** add a multiple of ten first (34 + 20 = 54), then a two-digit number with small ones (34 + 21 = 55).
- **Stretch:** find two different pairs of two-digit numbers that add to 79 without making a new ten (for example 45 + 34 and 23 + 56).
- Children who are blind or have low vision can feel the towers and loose cubes on either side of the raised line on the mat; the hundred square can be a large-print or tactile copy, or skipped in favour of cubes.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- Some children add all four digits together (3 + 4 + 2 + 5 = 14). Building with towers and loose cubes shows why that does not work.
- Keep to sums where the ones total 9 or less in this lesson; lesson 3 deals with making a new ten.

# Lesson 3: Adding when the ones make a new ten

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

## Goal

Children add two two-digit numbers where the ones make a new ten, by joining ten loose cubes into a tower, and explain why the tens go up by one.

## Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes and a tens-and-ones mat.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Make ten with loose cubes. Show 8 loose cubes and 5 loose cubes. "How many ones? Can we make a ten?" (13 ones: snap 10 into a tower, leaving 3, so 1 ten and 3 ones.) Repeat with 7 and 6 (13: 1 ten and 3 ones) and 9 and 9 (18: 1 ten and 8 ones).

### ✎ Main activity (30 min)

1. **A new ten (12 min).** On the board: 38 + 25. Build both numbers on the mat. "Tens: 3 and 2 are 5 tens. Ones: 8 and 5 are 13 ones. That is too many to leave loose: snap 10 of them into a tower and move it to the tens side. Now 6 tens and 3 ones: 63." Pairs build and add:
    - 47 + 26 (73)
    - 29 + 34 (63)
    - 56 + 18 (74)
2. **Say why (8 min).** Each pair explains one sum to another pair using the cubes: "7 ones and 6 ones are 13 ones. 10 ones make a new ten, so there are 4 + 2 + 1 = 7 tens and 3 ones: 73."
3. **Ones exactly ten (10 min).** 45 + 45. Ones: 5 and 5 are 10, which makes a whole new ten with no loose ones left. Tens: 4 + 4 + 1 = 9 tens, 0 ones:
4. Pairs try 36 + 24 (60) and 17 + 53 (70), then record one sum in their own way.

### ✓ Discussion questions (with answers)

- Why does the tens number go up by one in 38 + 25? The 13 ones contain a full ten, which joins the other tens.

- Why is 45 + 45 not "8 tens and 10 ones"? 10 ones is the same as 1 ten, so we write it as 9 tens and 0 ones: 90.
- How can you tell before adding whether the ones will make a new ten? If the two ones digits add to 10 or more.

### ✓ Closing check (10 min, with answers)

"Show me 27 + 35 with cubes or a drawing and tell me or a partner what happened to the ones." (62: 7 and 5 are 12 ones, a new ten and 2 ones, so 2 + 3 + 1 = 6 tens and 2 ones.) Then, with digit cards, "48 + 16." (64.)

## Vocabulary

new ten, snap, too many ones, exchange

## Differentiation

- **Support:** start with a two-digit number plus a one-digit number that makes a new ten (27 + 5 = 32, as in grade 1), then 27 + 15.
- **Stretch:** add four two-digit numbers by finding friendly pairs: 12 + 30 + 18 + 20 (12 + 18 = 30, then 30 + 30 + 20 = 80).
- Children who cannot snap cubes can slide ten loose cubes into a cup marked "ten" instead; an adult or partner can build while the child directs.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- A common error is writing 513 for 38 + 25 (5 tens, then 13 ones). Ask "Is this more than 100? Is that sensible?" and rebuild with cubes.
- "Exchange" is optional vocabulary; "snap ten ones into a ten" is enough.

# Lesson 4: Taking away, breaking a ten, and checking by adding

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

## Goal

Children take away a two-digit number from a two-digit number, break a ten into ten ones when there are not enough ones, check by adding, and count up when the two numbers are close.

## Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes, a tens-and-ones mat and a hundred square.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Take away tens. "70 - 30?" (40.) "85 - 20?" (65.) "56 - 10?" (46.) Children use towers or the hundred square (jump up a row for each ten).

### ✎ Main activity (32 min)

1. **Enough ones (7 min).** 68 - 25: build 68, take away 2 towers and 5 loose cubes, leaving 4 towers and 3 cubes: 43. Pairs try 79 - 34 (45).
2. **Breaking a ten (12 min).** 52 - 17: build 52 (5 towers, 2 loose). "We need to take 7 ones but have only 2. Break one tower into 10 loose cubes: now 4 tens and 12 ones. Take 7 ones: 5 left. Take 1 ten: 3 tens left. 3 tens and 5 ones: 35." Pairs try:
    - 43 - 18 (25)
    - 60 - 24 (36: break a tower, so 5 tens and 10 ones; take 4 ones, leaving 6; take 2 tens, leaving 3)
3. **Check by adding (6 min).** "If 52 - 17 = 35, then 35 + 17 should be 52." Pairs put the 35 and the 17 back together with cubes (35 + 17 = 52, a new ten made from 5 and 7 ones), then check 25 + 18 = 43 and 36 + 24 = 60.
4. **Close numbers: count up (7 min).** 61 - 58: taking away 58 cubes is slow. "58 and what make 61?" On the hundred square: 58 to 60 is 2, 60 to 61 is 1, so 3. Pairs try 72 - 69 (3) and 40 - 37 (3).

### ✓ Discussion questions (with answers)

- Why do we break a ten in 52 - 17? There are only 2 ones and we need to take 7; one ten becomes 10 ones, giving 12.
- How does adding check a take-away? If we put back what we took away, we should get the number we started with.
- When is counting up quicker than taking away? When the two numbers are close together, like 61 and 58.

### ✓ Closing check (8 min, with answers)

"Show me 54 - 28 with cubes or a drawing, then check it by adding." (26: break a ten so there are 4 tens and 14 ones; take 8 ones, leaving 6; take 2 tens, leaving 2 tens; check 26 + 28 = 54.) Answer with digit cards, cubes, words or a drawing.

## Vocabulary

take away, break a ten, check, count up, difference

## Differentiation

- **Support:** stay with take-aways that need no breaking (68 - 25), then a one-digit number that needs breaking (32 - 5 = 27).
- **Stretch:** explain why 50 - 26 and 54 - 30 give the same answer (24 both times: adding 4 to both numbers keeps the difference the same).
- An adult or partner can break and move towers while the child directs; a child can answer by pointing to digit cards.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- The most common error is taking the smaller ones digit from the larger (52 - 17 giving 45, because "7 take away 2 is 5"). Building 52 and trying to take 7 loose cubes shows why that does not work.
- Keep "borrowing" out of the language; "break a ten into ten ones" says what happens.

# Lesson 5: One-step and two-step story problems

Unit overview - Previous: Lesson 4

About 45 minutes.

## Goal

Children solve one-step story problems within 100 of the five kinds and two-step story problems, by drawing the story and writing a number sentence with a box for the unknown.

## Materials

- Story-problem cards (one set per pair; the problems are in the steps below), each with a small picture, read aloud by the teacher or a partner.
- Per pair: 10 towers of ten linking cubes, 20 loose cubes and a tens-and-ones mat.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Quick facts from lesson 1: "8 + 5?" (13.) "16 - 9?" (7.) "6 + 7?" (13.)

### ✎ Main activity (32 min)

1. **Draw the story (10 min).** Read: "Remy had 36 shells and found 27 more. How many shells now?" Draw a long bar split into two parts, 36 and 27, with a box above the whole bar. Write 36 + 27 = □. Solve with cubes or tens and ones (63). Then: "The Little Hill shop had 54 apples. Some were sold. Now there are 38. How many were sold?" Draw a bar for 54 split into 38 and a box. Write 38 + □ = 54 or 54 - 38 = □ (16).
2. **Problem cards (14 min).** Pairs read each card (or have it read to them), draw the story, write a number sentence with a box, and solve:
    - "45 boats are in the harbour. 28 are red and the rest are blue. How many are blue?" (17; 28 + □ = 45.)
    - "Hen has 62 seeds. Mouse has 25 fewer seeds than Hen. How many seeds does Mouse have?" (37; 62 - 25 = □.)
    - "Goat picked 71 apples and Duck picked 48. How many more did Goat pick?" (23; 48 + □ = 71.)
    - Stretch: "Bear had some stamps. Bear got 25 more. Now Bear has 60. How many stamps did Bear have at the start?" (35; □ + 25 = 60.)
3. **Two steps (8 min).** "Bear had 40 berries, ate 12, then picked 25 more. How many berries now?" Draw two steps: 40 - 12 = 28, then 28 + 25 = 53. Pairs try: "23 people

are on the Little Hill bus. 15 get on and 9 get off. How many are on the bus now?" (29: 23 + 15 = 38, then 38 - 9 = 29.)

### ✓ Discussion questions (with answers)

- In the apple problem, why can we add or take away? The 38 apples left and the apples sold make the 54 we started with; 38 + □ = 54 and 54 - 38 = □ find the same missing part.
- "Mouse has 25 fewer" has the word "fewer". Do we add or take away? Take away: Mouse has less than Hen, so 62 - 25.
- How do you know a problem has two steps? Two things happen, one after the other, and we need the first answer to do the second.

### ✓ Closing check (8 min, with answers)

Read aloud: "Duck had 34 pebbles and found 19 more. Then Duck gave 20 to Hen. How many pebbles does Duck have now?" Children draw the story and answer with digit cards, cubes, words or a drawing. (33: 34 + 19 = 53, then 53 - 20 = 33.)

## Vocabulary

story problem, bar, part, whole, unknown, fewer, more than, two steps

## Differentiation

- **Support:** one-step problems with numbers to 50 that do not make or break a ten; act the story out with cubes before drawing.
- **Stretch:** write a two-step story problem for a partner, with the answer on the back.
- Story cards can be in large print or braille, read aloud, or acted with objects; the bar can be built from cube towers instead of drawn. Answers can be given by pointing or with a communication device.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- Key words can mislead: "more" appears in "How many more did Goat pick?", which is a take-away or missing-part problem. Drawing the story is more reliable than hunting for words.
- The bar drawing is one way to show a story; any drawing that shows the parts and the whole works.

# Grade 2 Mathematics: Hundreds, Tens and Ones to 1000 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1: Tens and ones to 100 and grade 2 term 1: Adding and taking away within 100

## Big idea

Ten ones make a ten, and ten tens make a hundred. The three digits of a number like 243 tell us how many hundreds, tens and ones there are, and a zero means "none of these". Because of this, we can compare numbers by looking at the hundreds first, and we can add or take away 10 or 100 by changing just one digit. Some numbers of things can be shared into pairs with none left over (even) and some cannot (odd), and things set out in equal rows can be counted by adding the rows.

## Outcomes

By the end of the unit most children can:

1. Show that 100 is ten tens, and that 100, 200, 300 and so on up to 900 are one, two, three and so on up to nine hundreds, with no tens and no ones.
2. Build, read and write three-digit numbers as numerals, as number names and as hundreds, tens and ones (243 = 200 + 40 + 3), including numbers with a zero (706 is 7 hundreds, 0 tens and 6 ones).
3. Count on within 1000, including across a hundred (198, 199, 200, 201), and count in fives, tens and hundreds from different starting numbers.
4. Compare two three-digit numbers by looking at the hundreds, then the tens, then the ones, and record the result with >, = or <.
5. Say 10 more, 10 less, 100 more and 100 less than a number from 100 to 900 in their heads, and add or take away whole hundreds (300 + 400 = 700) or whole tens (570 - 40 = 530) when no new ten or hundred is made.
6. Tell whether a group of up to 20 objects is odd or even by pairing them, write an even number as a double (14 = 7 + 7), and find the total of an array of up to 5 rows and 5 columns by adding equal rows (4 + 4 + 4 = 12).

## Prior knowledge

The grade 1 unit on tens and ones to 100 (tens and ones, comparing two-digit numbers with >, = and <, 10 more and 10 less) and the grade 2 term 1 unit on adding and taking away within 100. Children who are still building two-digit place value can work with hundreds and tens only (300, 340) before adding ones, in every lesson.

## Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work with cubes and hundred cards, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so counting in fives, tens and hundreds should come back in short daily practice (5 minutes).

1. Ten tens make a hundred
2. Hundreds, tens and ones
3. Counting in fives, tens and hundreds, and comparing
4. 10 more, 10 less, 100 more, 100 less
5. Odd and even, and equal rows

## Materials (whole class unless noted)

- Linking cubes too large to swallow, per pair: 10 towers of ten and 20 loose cubes (lessons 1 to 4), as in term 1. Straw bundles of ten wrapped with tape (no rubber bands, which may contain latex) work as well.
- Hundred cards, per pair: 9 squares of card, each the size of ten towers laid side by side, with a 10 by 10 grid drawn on and the grid lines raised with glued string or thick glue so they can be felt (lessons 1 to 4). Ten extra hundred cards for the class (lesson 1).
- A hundreds-tens-ones mat per pair: a sheet with three columns labelled hundreds, tens and ones, with raised lines (glued string) between them (lessons 2 to 4).
- Three sets of digit cards 0 to 9 per pair, so children can build and point to three-digit numbers (lessons 2 to 4).
- Number-name word cards per pair, in large print: one to nine, ten to nineteen, twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety, and hundred (lesson 2).
- Symbol cards >, = and < per pair, large enough to feel the shape (lessons 3 and 4).
- A large number line from 0 to 1000 marked in hundreds, for the board (lessons 3 and 4).
- A counting-in-tens chart for the board and one large-print copy per pair: ten rows, 10 to 100 in the first row, 110 to 200 in the second, and so on to 910 to 1000, with optional raised lines between rows (lesson 4).
- Hen's seed shop picture cards: a loose seed, a packet of 10 seeds and a box of 100 seeds (10 packets), plus order cards (lessons 1 and 2; see lesson 1).
- 20 counters per child, and a squared mat (a sheet ruled into 5 rows of 5 squares, with raised lines) per child (lesson 5).
- Whiteboards and pens, or paper and pencils.

## ⚠ Safety and access

- Use cubes and counters too large to swallow; no rubber bands.
- Towers, raised grid lines on the hundred cards and raised column lines on the mat let children who are blind or have low vision feel hundreds, tens and ones. Large-print or braille digit cards help children who read them.
- Pointing to digit cards, moving cubes and cards, sign, writing or a communication device all count as answers. Saying number names aloud is not required.
- No public timing or races. Counting games go round the class or pair, and a child may pass.

## Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "Show me 100 with towers. How many tens is it?" (10.) "Show me 600 with hundred cards." (6 cards.)
- "Build 438. How many hundreds, tens and ones? Write it as hundreds, tens and ones." (4 hundreds, 3 tens, 8 ones; 400 + 30 + 8.)
- Show the digit cards 5, 0, 6. "Read this number and build it." (Five hundred six: 5 hundreds, 0 tens, 6 ones.)
- "Count on in tens from 370." (380, 390, 400, 410.) "Count in fives from 225 to 250." (230, 235, 240, 245, 250.)
- "Which is more, 614 or 641? Put the right sign between them." (641; 614 < 641, because 1 ten is less than 4 tens.)
- "What is 100 more than 752? 10 less than 752? What is 400 + 500?" (852; 742; 900.)
- "Is 13 odd or even? Show me with counters." (Odd: 6 pairs and 1 left over.) "Make 3 rows of 5 counters and write an adding sentence for the total." (5 + 5 + 5 = 15.)

Record yes, with help or not yet for each part. A child who counts every cube in ones has the answer but not yet the place-value idea; note that rather than marking it wrong.

## Sources

- Common Core State Standards, Grade 2 Number and Operations in Base Ten (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/NBT/
  - 2.NBT.A.1 the three digits of a three-digit number represent amounts of hundreds, tens and ones ("706 equals 7 hundreds, 0 tens, and 6 ones"), with 100 as "a bundle of ten tens" and 100, 200 ... 900 as one to nine hundreds; 2.NBT.A.2 count within 1000 and skip-count by 5s, 10s and 100s; 2.NBT.A.3 read and write numbers to 1000 using base-ten numerals, number names and expanded form; 2.NBT.A.4 compare two three-digit numbers using

    , = and <; 2.NBT.B.8 mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from it.

- Common Core, Grade 2 Operations and Algebraic Thinking: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/OA/
  - 2.OA.C.3 odd or even for groups of up to 20 objects, "by pairing objects or counting them by 2s", and an even number as a sum of two equal addends; 2.OA.C.4 the total of a rectangular array with up to 5 rows and up to 5 columns, as a sum of equal addends.

## Known gaps and cautions

- One other agent (Gemini 4 Argon, at 74bdc04) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- Adding and taking away three-digit numbers where a new ten or hundred is made, or one has to be broken (2.NBT.B.7), is only touched as a stretch task (10 more than 395, 10 less

than 608). Adding up to four two-digit numbers (2.NBT.B.6) is not taught here. The grade 2 year plan does not give either a full unit, so a teacher may want to add one.

- English number names differ: some speakers say "five hundred six" and others "five hundred and six". Both are accepted; use the form your school uses on the word cards.
- Hundred cards are flat while towers are not, so a hundred card stands for ten towers rather than looking exactly like them. Lesson 1 has children lay towers on a card to check.
- Arrays stop at 5 by 5 and only use adding; multiplying is left for grade 3.
- Hen's seed shop and the other names (Duck, Mouse, Goat, Bear) are the made-up Little Hill characters used in other units.
- The lesson order, timings, examples and the seed-shop context are my choice, not taken from a source.

# Lesson 1: Ten tens make a hundred

Unit overview - Next: Lesson 2

About 45 minutes.

## Goal

Children see that ten tens make a hundred, use hundred cards to stand for a hundred, and count in hundreds to 1000.

## Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes and 9 hundred cards (10 by 10 grid, raised lines).
- Ten extra hundred cards for the class.
- Hen's seed shop picture cards: a loose seed, a packet of 10 seeds, and a box of 100 seeds (10 packets), plus order cards: "3 boxes", "5 boxes", "2 boxes and 4 packets", "6 boxes, 1 packet and 7 seeds".
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Count in tens to 100 together, holding up a tower for each ten: 10, 20, 30 ... 100. "How many towers did we need to make 100?" (10.)

### ✎ Main activity (30 min)

1. **Ten towers on a card (10 min).** Each pair lays its 10 towers side by side on one hundred card. "The towers cover the whole card. Ten tens is one hundred." Children count the towers in tens to check (10, 20 ... 100) and run a finger along one row of the grid (10 squares) and down one column (10 rows). From now on, one hundred card stands for ten towers.
2. **Counting in hundreds (10 min).** Pairs put their hundred cards in a line along the floor or tables, and the class counts them in hundreds: 100, 200, 300 ... When the line has 9 cards, ask "What is one more hundred?" Add one of the class's extra cards: 1000, "one thousand", which is ten hundreds. Count back in hundreds from 1000 to 100. Ask "How many hundreds make 700?" (7) and "What number is 4 hundreds?" (400).
3. **Hen's seed shop (10 min).** Show the seed shop cards: Hen sells loose seeds, packets of 10 and boxes of 100. Read each order card; pairs build it with hundred cards, towers and cubes and say the number:
    - "3 boxes" (300)
    - "5 boxes" (500)
    - "2 boxes and 4 packets" (240)

    - "6 boxes, 1 packet and 7 seeds" (617)

### ✓ Discussion questions (with answers)

- How many ones are in a hundred? 100: ten tens, and each ten is ten ones.
- Why do we use a card instead of ten towers? It is quicker to build and count big numbers; the card covers exactly the same space as ten towers.
- What is ten hundreds? One thousand (1000).

### ✓ Closing check (10 min, with answers)

"Show me 400 with hundred cards." (4 cards.) "How many tens make 100?" (10.) "How many hundreds is 700?" (7.) Note who counts the cards in hundreds and who counts the grid squares one by one.

## Vocabulary

hundred, hundred card, tens, ones, thousand, box, packet

## Differentiation

- **Support:** build 100 with towers first, then 200 with towers on two cards, before using cards alone.
- **Stretch:** "Hen has 1000 seeds in boxes. How many boxes?" (10.) "How many packets of 10 make 300?" (30.)
- Children who are blind or have low vision feel the towers on the card and the raised grid; the line of cards can be on a table so it can be touched along its length.

## ⚠ Safety

Use cubes too large to swallow. Keep the floor line of cards out of walkways.

## Teacher notes and misconceptions

- Some children think a hundred card is "one" because it is one piece. Keep asking "How many tens is that card?" and let them check with towers.
- Thousand is mentioned only as ten hundreds; numbers above 1000 are not taught.

# Lesson 2: Hundreds, tens and ones

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

## Goal

Children build, read and write three-digit numbers as numerals, number names and hundreds, tens and ones, including numbers with a zero.

## Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes and a hundreds-tens-ones mat.
- Three sets of digit cards 0 to 9 per pair.
- Number-name word cards per pair (one to nine, ten to nineteen, twenty to ninety, hundred).
- Hen's seed shop picture cards (from lesson 1).
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Count in hundreds from 100 to 900 and back, pointing to hundred cards. Show the seed shop box card: "How many seeds in 3 boxes?" (300.)

### ✎ Main activity (30 min)

1. **Build it and read it (10 min).** On the board: 243. Build it on the mat: 2 hundred cards, 4 towers and 3 loose cubes. "2 hundreds, 4 tens and 3 ones: two hundred forty-three." Show the digit cards 2, 4, 3 under the right columns. Pairs build, put digit cards under and read:
    - 365
    - 512
    - 128
2. **When there is a zero (10 min).** Build 706: 7 hundred cards, no towers, 6 cubes. "The tens column is empty, so we write 0 tens: seven hundred six." Then build 760 and 67 next to it. "Which has the most? Which digit tells you?" (760: it has 7 hundreds and 6 tens; 67 has no hundreds.) Pairs build 607 and 670 and say how they differ (607 has 0 tens and 7 ones; 670 has 7 tens and 0 ones).
3. **Three ways to write it (10 min).** Show 352 three ways: the numeral, the name (three hundred fifty-two, with word cards) and hundreds, tens and ones (300 + 50 + 2). Pairs choose two numbers they built and write each in all three ways. Words may be built from word cards instead of written.

### ✓ Discussion questions (with answers)

- Why can't we leave out the 0 in 706? Without it, the 7 and 6 move up and the number reads 76, which is much less.
- In 352, what is the 5 worth? 50, or 5 tens.
- Is 300 + 50 + 2 the same number as 352? Yes, it is the same number split into hundreds, tens and ones.

### ✓ Closing check (10 min, with answers)

"Build 409 and tell me how many hundreds, tens and ones." (4 hundreds, 0 tens, 9 ones; 400 + 9.) "What number is 300 + 50 + 2?" (352.) Note who puts a 0 in the tens place and who writes 49.

## Vocabulary

hundreds, tens, ones, digit, zero, number name

## Differentiation

- **Support:** build only hundreds and tens first (340, 520), then add ones.
- **Stretch:** "Make the biggest and the smallest number you can with the digit cards 3, 0 and 8." (830 and 308; a number does not start with 0.)
- Children who are blind or have low vision feel the raised columns on the mat and the grid on the hundred cards; number names can be said, signed or pointed to instead of written.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- Some children write two hundred forty-three as 20043, writing each part as they hear it. Building on the mat and putting one digit card under each column helps.
- Some speakers say "two hundred and forty-three". Both forms are fine.

# Lesson 3: Counting in fives, tens and hundreds, and comparing

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

## Goal

Children count on within 1000, including across a hundred, count in fives, tens and hundreds from different starting numbers, and compare three-digit numbers using >, = and <.

## Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes, a hundreds-tens-ones mat, three sets of digit cards 0 to 9, and symbol cards

  , = and <.

- The large number line from 0 to 1000 marked in hundreds, for the board.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Count in fives from 0 to 50 together, clapping on each number. Then count on in ones from 196 to 204, pointing near 200 on the number line: 197, 198, 199, 200, 201 ... "What happened after 199?" (A new hundred: 200.)

### ✎ Main activity (30 min)

1. **Counting from different places (10 min).** Go round the class or pair, each child saying the next number (a child may pass):
   - fives from 115 to 150 (120, 125, 130, 135, 140, 145, 150)
   - tens from 340 to 420 (350, 360, 370, 380, 390, 400, 410, 420)
   - hundreds from 50 to 950 (150, 250, 350 ... 950) Point to roughly where each count is on the number line.
2. **Which is more? (10 min).** Duck's sack has 352 seeds; Mouse's sack has
3. Pairs build both. "Look at the hundreds first: both have 3. Then the tens: 5 tens is more than 2 tens. So 352 is more." Write 352 > 325 and read it: "352 is greater than 325." Show that < means "is less than", and that the wide-open side of the sign faces the bigger number. Pairs compare and put a symbol card between:
   - 418 and 481 (418 < 481)
   - 609 and 690 (609 < 690)
   - 700 and 699 (700 > 699)
   - 534 and 534 (534 = 534)

4. **Make and compare (10 min).** Each child in a pair draws three digit cards and makes a three-digit number (not starting with 0). Together they build both, put the right symbol between and read the sentence. Play several rounds; there is no winner, only the sentence.

### ✓ Discussion questions (with answers)

- Why do we look at the hundreds first? A hundred is more than any number of tens and ones we could have in the other columns (99 at most), so the hundreds decide unless they are the same.
- 700 has only zeros after the 7. Why is it more than 699? 700 has 7 hundreds; 699 has only 6 hundreds and 9 tens and 9 ones, which is one less.
- What comes after 399? 400.

### ✓ Closing check (10 min, with answers)

"Which is more, 263 or 236? How do you know?" (263: same hundreds, and 6 tens is more than 3 tens.) "Put the right sign: 507 and 570." (507 < 570.) "Count on in tens from 280." (290, 300, 310.)

## Vocabulary

greater than, less than, equal to, compare, count on, fives

## Differentiation

- **Support:** compare numbers with different hundreds first (245 and 512), building both, before numbers with the same hundreds.
- **Stretch:** "Put these in order from least to greatest: 489, 498, 849, 894." (489, 498, 849, 894.) Count back in tens from 430 to 370 (420, 410, 400, 390, 380, 370).
- Children who are blind or have low vision feel the symbol cards and the built numbers; counts can be tapped on a table as well as said.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- Some children say 418 is more than 481 "because 8 is bigger than 1". Going column by column, starting with the hundreds, fixes this.
- Counting on across a hundred (what comes after 399, or after 390 when counting in tens) is often shaky; keep it in daily counting practice.

# Lesson 4: 10 more, 10 less, 100 more, 100 less

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

## Goal

Children say 10 more, 10 less, 100 more and 100 less than a number from 100 to 900 in their heads, and add or take away whole hundreds or whole tens when no new ten or hundred is made.

## Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes, a hundreds-tens-ones mat, three sets of digit cards 0 to 9 and symbol cards

  , = and <.

- The counting-in-tens chart for the board and one large-print copy per pair.
- The large number line from 0 to 1000 marked in hundreds.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Quick 10 more and 10 less within 100, as in term 1: "10 more than 47?" (57.) "10 less than 62?" (52.) "10 more than 90?" (100.)

### ✎ Main activity (30 min)

1. **Change one card (10 min).** Pairs build 346. "Add one hundred card. What number is it now?" (446.) "Take it away again and add one tower." (356.) "Which digit changed each time?" (The hundreds digit for 100 more, the tens digit for 10 more.) Pairs build, change and say:
   - 100 more than 521 (621)
   - 100 less than 874 (774)
   - 10 more than 235 (245)
   - 10 less than 653 (643)
2. **The counting-in-tens chart (10 min).** On the chart, 10 more is one step along a row and 100 more is one row down. Start at 340: one step along (350), one row down (450). Pairs find on their copies: 100 less than 580 (480), 10 more than 720 (730), 100 more than 260 (360). Then without the chart: "What is 100 more than 263?" (363.)
3. **Whole hundreds and whole tens (10 min).** "3 hundreds and 4 hundreds is 7 hundreds, so 300 + 400 = 700." Pairs work out in their heads and check with cards:
   - 300 + 400 (700)

- 800 - 500 (300)
- 240 + 30 (270)
- 570 - 40 (530)
- 600 + 200 + 100 (900)

### ✓ Discussion questions (with answers)

- Why does only one digit change when we add 100 to 346? We add one hundred, so only the number of hundreds changes; the tens and ones stay the same.
- Why is 300 + 400 like 3 + 4? We are adding hundreds instead of ones: 3 hundreds and 4 hundreds are 7 hundreds.
- On the chart, why is one row down 100 more? Each row has ten steps of 10, which is 100.

### ✓ Closing check (10 min, with answers)

"What is 100 more than 263?" (363.) "10 less than 263?" (253.) "What is 500 + 300?" (800.) "700 - 200?" (500.) Note who answers in their head and who needs to build.

## Vocabulary

10 more, 10 less, 100 more, 100 less, in my head

## Differentiation

- **Support:** keep building every number and changing one card or tower before trying in their heads.
- **Stretch:** "10 more than 395?" (405: 9 tens and 1 more ten make a new hundred.) "10 less than 608?" (598: a hundred is broken into ten tens.) Children check with cards and towers.
- Children who are blind or have low vision use the mat and cards; the counting-in-tens chart can have raised lines between rows, or be skipped in favour of building.

## ⚠ Safety

Use cubes too large to swallow.

## Teacher notes and misconceptions

- Some children add 100 by adding 1 to the ones digit (346 becomes 347). Ask "What did you add: a cube, a tower or a hundred card?"
- The stretch tasks cross a hundred, which needs a new hundred to be made or a hundred to be broken. That is not expected of everyone in this unit.

# Lesson 5: Odd and even, and equal rows

Unit overview - Previous: Lesson 4

About 45 minutes.

## Goal

Children tell whether a group of up to 20 objects is odd or even by pairing, write an even number as a double, and find the total of an array with up to 5 rows and 5 columns by adding equal rows.

## Materials

- 20 counters per child, too large to swallow.
- A squared mat per child: a sheet ruled into 5 rows of 5 squares, with raised lines.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Count in twos to 20 together, then back to 0.

### ✎ Main activity (30 min)

1. **Can every counter have a partner? (12 min).** Take 12 counters and put them in pairs: 6 pairs and none left over. "12 is even." Take 13: 6 pairs and 1 left over. "13 is odd." Children test these and sort them into odd and even:
    - 8 (even: 4 pairs)
    - 11 (odd: 5 pairs and 1 left)
    - 14 (even: 7 pairs)
    - 17 (odd: 8 pairs and 1 left)
    - 20 (even: 10 pairs)
    - 9 (odd: 4 pairs and 1 left) Then split each even number into two equal rows and write it as a double: 12 = 6 + 6, 14 = 7 + 7, 20 = 10 + 10.
2. **Goat's carrot rows (13 min).** Goat plants carrots in rows with the same number in each row. Show 3 rows of 4 on the mat: "4 + 4 + 4 = 12." Children build each array on their mat with counters and write an adding sentence:
    - 2 rows of 5 (5 + 5 = 10)
    - 4 rows of 3 (3 + 3 + 3 + 3 = 12)
    - 3 rows of 5 (5 + 5 + 5 = 15)
    - 5 rows of 5 (5 + 5 + 5 + 5 + 5 = 25)
3. **Turn it round (5 min).** Turn the mat a quarter turn so 4 rows of 3 become 3 rows of 4. "Is it the same number of carrots?" (Yes, 12: 3 + 3 + 3 + 3 = 12 and 4 + 4 + 4 = 12.)

### ✓ Discussion questions (with answers)

- How can you tell 17 is odd without counting by ones? Put the counters in pairs: one is always left over.
- Is every double an even number? Yes: two equal rows can always be put together in pairs, one from each row.
- Why is adding rows quicker than counting every carrot? Each row has the same number, so we can count on in that number.

### ✓ Closing check (10 min, with answers)

"Is 15 odd or even? Show me." (Odd: 7 pairs and 1 left over.) "Write 16 as a double." (8 + 8.) "Make 2 rows of 4 and write an adding sentence." (4 + 4 = 8.)

## Vocabulary

odd, even, pair, double, row, column, array

## Differentiation

- **Support:** work with numbers up to 10 for odd and even, and arrays with 2 rows first.
- **Stretch:** "Make every array you can with 12 counters, using no more than 5 rows and 5 columns." (3 rows of 4 and 4 rows of 3.) "Is the total of two odd numbers odd or even? Try some." (Even: the two left-over counters make a pair.)
- Children who are blind or have low vision feel the raised squares on the mat and the pairs of counters; answers can be said, signed or shown with counters.

## ⚠ Safety

Use counters too large to swallow.

## Teacher notes and misconceptions

- Some children think a number is even if it "looks big" or ends in a big digit. Pairing real counters is the check.
- Multiplying and the times sign are not taught here; arrays are counted by adding equal rows.

# Grade 2 Mathematics: Measuring, Time, Money and Shapes (5 lessons, about 5 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check coins, units and clock conventions against your school's rules and your country's money.
>
> Text-checked by two other agents (Gemini 3.8 Flash and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1: Measuring length and composing shapes and grade 2 term 2: Hundreds, tens and ones to 1000

## Big idea

We measure by counting equal units, and a ruler is a line of equal units already counted for us, starting from 0. A smaller unit needs more of them to cover the same length. Clocks and coins also use counting: the minute hand moves in fives, and coins of different values can be counted on from the biggest. Shapes can be named by counting their sides and corners, and a bar graph lets us count and compare a set of data at a glance.

## Outcomes

By the end of the unit most children can:

1. Measure a length to the nearest whole centimetre with a ruler, starting at the 0 mark, and say how much longer one length is than another (25 cm is 10 cm longer than 15 cm).
2. Measure the same length in centimetres and in inches, explain why the number of centimetres is bigger (a centimetre is a smaller unit, so more of them are needed), and estimate lengths in centimetres, inches, feet or metres before measuring.
3. Tell and write the time to five minutes on a clock with hands and as digital time (4:25), and say whether a time in a story is a.m. or p.m.
4. Find the value of a set of coins (pennies, nickels, dimes and quarters) by counting on from the biggest value, write it with the ¢ sign, know that $1 is 100¢, and solve one-step story problems with made-up prices.
5. Name triangles, quadrilaterals, pentagons and hexagons by counting sides and corners, say how many faces a cube has, and put shapes together to make a new shape.
6. Make a bar graph with up to four categories, one square for each item, and use it to answer "how many altogether?" and "how many more?" questions.

## Prior knowledge

The grade 1 unit on measuring length and composing shapes (lining up ends, measuring with equal units laid end to end, triangles, squares and rectangles, putting shapes together), counting in fives and tens from grade 2 term 2, and adding and taking away within 100 from grade 2 term 1. No earlier unit in this set teaches clocks or coins, so lesson 3 starts with o'clock and half past and lesson 4 starts by meeting the coins.

## Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work and a closing check. The five topics are quite different, so a teacher may want to spread each lesson over two or three days; the unit runs over about 5 weeks, with short daily practice (5 minutes) reading the class clock and counting coins.

1. Measuring with a centimetre ruler
2. Centimetres and inches
3. Telling the time to five minutes
4. Counting coins at the Little Hill market
5. Sides, corners and a shape bar graph

## Materials (whole class unless noted)

- A 30 cm ruler per pair, marked in whole centimetres with the 0 clearly marked, and with inches on the other edge (lessons 1 and 2). Tactile rulers with raised or notched marks for children who need them.
- Paper strips per pair, cut exactly to length, each with its letter in large print and a raised dot sticker on the left end: A 10 cm, B 15 cm, C 20 cm, D 25 cm and E 12 cm (lessons 1 and 2). A few spare raised dot stickers.
- Linking cubes too large to swallow, about 10 per pair, as in grade 1 (lesson 1).
- Small classroom objects per pair to measure: a pencil, a crayon, a glue stick and a book (lessons 1 and 2).
- A large board ruler or number line from 0 to 40 (lesson 1).
- A metre stick and a 12-inch ruler (one foot) for the teacher (lesson 2).
- A two-column chart headed "centimetres" and "inches" for the board, and a copy per pair (lesson 2).
- A teaching clock with geared hands for the board, and a card clock per pair with an hour hand and a minute hand fixed by a paper fastener (lesson 3; see Safety and access).
- Digital time cards in large print, and Little Hill day cards (lesson 3; see lesson 3).
- A minutes card per pair for support: a ring of 5, 10, 15 ... 60 to sit around the card clock (lesson 3).
- Card coins per pair, too large to swallow, printed on both sides with the value raised (glued string or thick glue) so it can be felt: 4 quarters, 6 dimes, 6 nickels and 10 pennies, plus one card dollar bill (lesson 4).
- Little Hill market price cards with made-up prices (lesson 4; see lesson 4).
- Card shapes per pair in different sizes and turned different ways: triangles, quadrilaterals (including squares, rectangles and some with no equal sides), pentagons and hexagons (lesson 5).
- Pattern blocks too large to swallow, per pair: 6 triangles, 2 trapezoids, 2 rhombuses (diamonds) and 1 hexagon (lesson 5).
- A cube per pair, such as a large wooden or foam block (lesson 5).
- A shape bag per pair holding exactly 19 card shapes: 5 triangles, 7 quadrilaterals, 3 pentagons and 4 hexagons (lesson 5).
- Squared paper (2 cm squares) and dot paper per child; card squares and glue for raised bar graphs (lesson 5). Small stickers for marking corners (lesson 5).
- A bar graph for the board made with raised card squares: boats on the Little Hill pond, with sailing boats 3, rowing boats 5 and canoes 2 (lesson 5).
- Whiteboards and pens, or paper and pencils.

## ⚠ Safety and access

- **Small parts:** card coins, not real coins (real coins are a choking risk and are handled by many people). Pattern blocks and shapes too large to swallow.
- **Card clocks:** an adult fixes the paper fasteners before the lesson and tapes over the sharp ends on the back.
- **Seeing and touching:** tactile rulers, raised dot stickers on the strips, card coins with raised values, raised clock numbers (glued string or thick glue dots) and bar graphs made from stuck-on card squares let children who are blind or have low vision measure, read and compare by touch. Large-print or braille labels help children who read them. Children can feel the clock hands on the teaching clock or their card clock.
- **Answering:** pointing, moving cards, sign, writing or a communication device all count as answers. Saying number names aloud is not required.
- **Privacy:** times, prices and data in the lessons are about the made-up Little Hill characters and a bag of shapes. Never ask children about their own wake or bed times, family money, pocket money or what things cost at home.
- No public timing or races. Games go round the pair or group, and a child may pass.

## Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the last week:

- Give strip E and a ruler. "How long is this strip?" (12 cm.) "Strip D is 25 cm. How much longer is it than strip E?" (13 cm.)
- "Measure strip C in centimetres and in inches." (20 cm; about 8 inches.) "Why is the number of inches smaller?" (An inch is longer than a centimetre, so fewer inches fit.)
- Set the teaching clock to 9:50. "What time is it? Write it." (9:50; ten to ten is also fine.) "Duck eats breakfast at 7:20. Is that a.m. or p.m.?" (a.m.)
- Give a quarter, a dime, a nickel and two pennies. "How much money is this?" (42¢.) "A ribbon costs 20¢ and a pencil costs 15¢. How much for both?" (35¢.)
- Show a card shape with 6 sides that are not all the same length. "What is this shape called? How do you know?" (A hexagon: 6 sides and 6 corners.) "How many faces does a cube have?" (6.)
- Show a bar graph of kites at the Little Hill fair: red 4, blue 6, yellow 2, green 3. "How many kites altogether?" (15.) "How many more blue kites than yellow kites?" (4.)

Record yes, with help or not yet for each part. A child who starts a ruler at the 1 mark and is 1 out every time has a measuring habit to fix, not a counting problem; note that rather than marking it wrong.

## Sources

- Common Core State Standards, Grade 2 Measurement and Data (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/MD/
  - 2.MD.A.1 "Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes."; 2.MD.A.2 measure an object twice with units of different lengths and "describe how the two measurements relate to the size of the unit chosen"; 2.MD.A.3 "Estimate lengths using units of

inches, feet, centimeters, and meters."; 2.MD.A.4 measure "how much longer one object is than another".
    - 2.MD.B.5 adding and taking away within 100 in word problems about lengths, "by using drawings (such as drawings of rulers)".
    - 2.MD.C.7 "Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m."; 2.MD.C.8 "Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately." with the example "If you have 2 dimes and 3 pennies, how many cents do you have?"
    - 2.MD.D.10 "Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories."
- Common Core, Grade 2 Geometry: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/G/
    - 2.G.A.1 "Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces." and "Identify triangles, quadrilaterals, pentagons, hexagons, and cubes."
- Common Core, Grade 1 Measurement and Data, read to check what children may have met before: 1.MD.B.3 "Tell and write time in hours and half-hours using analog and digital clocks." https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/MD/

## Known gaps and cautions

- Two other agents (Gemini 3.8 Flash and Gemini 4 Argon, both at 122c91c) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- Some grade 2 standards are not taught here: line plots of measurement data (2.MD.D.9), partitioning a rectangle into rows and columns of squares (2.G.A.2), and halves, thirds and fourths of circles and rectangles (2.G.A.3). Number lines (2.MD.B.6) appear only in lesson 1. A teacher may want to add these.
- The coins are United States coins because the Common Core standard names them. Schools in other countries should use their own coins and change the values in lesson 4. Writing amounts with a decimal point ($0.42) is not taught; amounts under a dollar are written with ¢.
- Inches and feet are used in the United States; many other countries use only centimetres and metres. Lesson 2 can be taught with centimetres and a longer unit such as a 5 cm card strip instead of inches.
- The strips in lessons 1 and 2 were chosen so the inch measurements are close to whole numbers (25 cm is about 9.8 inches, so "about 10 inches"). Children measure to the nearest whole unit, so small differences between pairs are expected.
- Many rulers have a gap before the 0 mark. Lesson 1 teaches starting at 0 for this reason.
- Clocks with hands are less common in some homes than digital ones, so some children will need much more practice than one lesson; the daily 5 minutes matters. Times are always on a five-minute mark; reading to the nearest five minutes when the hand is between marks is left for later practice.
- The prices, times and graph data are made up for Little Hill and are not real prices or schedules. Duck, Hen, Mouse, Goat and Mayor Hen are the made-up Little Hill characters used in other units.
- The lesson order, timings, strip lengths, examples and contexts are my choice, not taken from a source.

# Lesson 1: Measuring with a centimetre ruler

Unit overview - Next: Lesson 2

Back to the grade 2 year plan

About 45 minutes.

## Goal

Children measure lengths to the nearest whole centimetre with a ruler, starting at the 0 mark, and find how much longer one length is than another.

## Materials

- A 30 cm ruler per pair, with the 0 clearly marked. Tactile rulers with raised or notched marks for children who need them.
- Paper strips per pair, cut exactly to length, each with its letter in large print and a raised dot sticker on the left end: A 10 cm, B 15 cm, C 20 cm, D 25 cm and E 12 cm. A few spare raised dot stickers.
- Small classroom objects per pair: a pencil, a crayon, a glue stick and a book.
- A large board ruler or number line from 0 to 40.
- Linking cubes too large to swallow, about 10 per pair, for the opening.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Hold up strip C next to a row of linking cubes laid end to end. "In grade 1 we measured by laying equal units with no gaps or overlaps. How many cubes long is this strip?" (Count with the class; the answer depends on your cubes.) "Different cubes give different answers. A ruler uses a unit everyone agrees on: the centimetre. The small spaces between the marks are each one centimetre, and the numbers have already counted them for us."

### ✎ Main activity (30 min)

1. **Start at 0 (10 min).** On the board ruler, show that the numbers count the spaces, not the lines: the space from 0 to 1 is the first centimetre. Show strip A lined up with the very end of a real ruler (many rulers have a gap before the 0) and read where it ends. Then line it up with the 0 mark. "Which way gives the right length?" (Starting at 0: strip A is 10 cm.) Next lay strip A from the 1 mark to the 11 mark. "It ends at 11. Is it 11 cm long?" (No: count the spaces from 1 to 11; there are 10.) Children who use a tactile ruler feel for the 0 notch first.
2. **Measure the strips (10 min).** Pairs measure strips A to D, taking turns to hold the ruler and to read the number, and write each length with "cm": A 10 cm, B 15 cm, C 20 cm, D 25 cm. Then they measure the pencil, crayon, glue stick and book to the nearest

whole centimetre. "If the end is between two numbers, which number is it closer to?" Answers for the objects will differ between pairs.

3. **How much longer? (10 min).** "Put strips D and B side by side, lined up at one end. How much longer is D?" Measure the part of D that sticks out, or take away: 25 - 15 = 10, so D is 10 cm longer. Repeat with C and A (10 cm) and D and A (15 cm). Then a story, drawn as a ruler on the board with jumps along the number line: "Goat's kite tail is 34 cm long. Duck's kite tail is 20 cm long. How much longer is Goat's?" (34 - 20 = 14, so 14 cm.) Show the jump from 20 to 34 on the board number line.

### ✓ Discussion questions (with answers)

- Why do we start at 0 and not at the end of the ruler? The numbers count centimetres from the 0 mark. Many rulers have a gap before the 0, so starting at the end gives the wrong length.
- Why is everyone's strip D the same length but their pencils different? The strips were cut to the same length; the pencils are different pencils.
- Can you measure a strip that does not start at 0? Yes, by counting the centimetres from where it starts to where it ends, but starting at 0 is easier.

### ✓ Closing check (10 min, with answers)

"Measure strip E." (12 cm.) "A strip starts at 2 and ends at 9 on a ruler. How long is it?" (7 cm.) "Mouse's ribbon is 18 cm long and Hen's ribbon is 30 cm long. How much longer is Hen's ribbon?" (12 cm.) Note who starts at 0 every time and who still starts at the end or at 1.

## Vocabulary

centimetre, cm, ruler, length, measure, longer, shorter, how much longer, nearest

## Differentiation

- **Support:** measure only strips A to D, which end on numbers that end in 0 or 5, before measuring objects. Put a spare raised dot sticker on the 0 mark of the ruler.
- **Stretch:** "Which two strips together are as long as strip D?" (A and B: 10 + 15 = 25.) "How much longer is strip D than strip E?" (13 cm.)
- Children who are blind or have low vision use a tactile ruler and the raised dot on the left end of each strip, and count notches from the 0 notch with a finger.

## ⚠ Safety

Use linking cubes too large to swallow. Rulers stay on tables, not waved.

## Teacher notes and misconceptions

- Many children start at the end of the ruler or at 1. Ask "Where does the first centimetre start?" and let them check by counting spaces.

- Some children count the lines instead of the spaces and get one more than the length. Point to each space as it is counted.
- "Cm" is the short way to write centimetres; the "s" is never added.

# Lesson 2: Centimetres and inches

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Back to the grade 2 year plan

About 45 minutes.

## Goal

Children measure the same strips in centimetres and in inches, explain why the number of centimetres is bigger, and estimate lengths before measuring.

## Materials

- A 30 cm ruler per pair with inches on the other edge. Tactile rulers with raised or notched marks for children who need them.
- Paper strips A to E per pair from lesson 1 (A 10 cm, B 15 cm, C 20 cm, D 25 cm, E 12 cm), each with a raised dot sticker on the left end.
- Small classroom objects per pair: a pencil, a crayon, a glue stick and a book.
- A metre stick and a 12-inch ruler (one foot) for the teacher.
- A two-column chart for the board headed "centimetres" and "inches", and a copy per pair.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

"Last time strip D was 25 cm long. Turn your ruler over. The other edge has bigger spaces. Each of those spaces is one inch." Show one centimetre and one inch on the board side by side. "Which is longer, a centimetre or an inch?" (An inch.)

### ✎ Main activity (30 min)

1. **Measuring in inches (10 min).** Pairs measure strips A to D on the inch edge, starting at 0, to the nearest whole inch, and write the answers in the inches column of their chart. The strips do not end exactly on an inch mark, so the class agrees which mark each end is closest to: A about 4 inches, B about 6 inches, C about 8 inches, D about 10 inches.
2. **Same strip, two numbers (10 min).** Pairs copy the centimetre lengths from lesson 1 into the other column: A 10, B 15, C 20, D 25. "Strip D is 25 cm and about 10 inches. It is the same strip. Why is the number of centimetres bigger?" Take ideas, then show with strip D: lay a finger on each centimetre space and then on each inch space. "An inch is longer than a centimetre, so fewer inches fit along the strip. A smaller unit needs more of them." Link to grade 1: when the class measured with smaller units, it needed more of them to cover the same length.

3. **Estimate, then measure (10 min).** Show the metre stick (100 cm) and the 12-inch ruler ("12 inches is one foot"; a 30 cm ruler is about one foot long). For each object, pairs first write a guess, then measure:
    - the pencil and the book in centimetres;
    - the crayon and the glue stick in inches;
    - with the teacher: "Is the classroom door wider or narrower than one metre?" The teacher holds the metre stick against the door so the class can check.

Guesses that are close count as good estimates; the point is to have a picture of each unit in mind.

### ✓ Discussion questions (with answers)

- If you measure the same book in centimetres and in inches, which number is bigger? The centimetres, because a centimetre is a smaller unit.
- Why did different pairs get "about 6 inches" for strip B when it does not end exactly on 6? It is closer to the 6 mark than to the 5 or 7 mark, so we say about 6 inches.
- Would you measure the classroom in centimetres or in metres? Metres would be quicker; centimetres would give a very big number.

### ✓ Closing check (10 min, with answers)

"Measure strip E in inches." (About 5 inches.) "A strip is 8 inches long. Will its length in centimetres be a bigger number or a smaller number?" (Bigger.) "Which do you need more of to measure the same book, centimetres or inches?" (Centimetres.) Note who explains with the size of the unit and who only says "because the numbers are different".

## Vocabulary

inch, foot, metre, centimetre, estimate, about, unit, closest

## Differentiation

- **Support:** measure strips C and D only, with a finger walking along each inch space while counting.
- **Stretch:** "Strip D is about 10 inches. Two strips D laid end to end would be about how many inches?" (About 20.) "How many centimetres?" (50.)
- Children who are blind or have low vision feel the bigger notches on the inch edge of a tactile ruler and compare one centimetre space with one inch space by touch.

## ⚠ Safety

Only the teacher handles the metre stick. Rulers stay on tables, not waved.

## Teacher notes and misconceptions

- Some children think a bigger number means a longer object even when the units differ. Keep putting the same strip next to both edges of the ruler.
- On some rulers the inch edge is split into halves and quarters as well. Show children which marks are the whole inches (the longest marks with numbers).
- In countries that do not use inches, the same idea can be shown with centimetres and a 5 cm card strip as a longer unit.

# Lesson 3: Telling the time to five minutes

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Back to the grade 2 year plan

About 45 minutes.

## Goal

Children read and set times to five minutes on a clock with hands, write them as digital times, and decide whether a time in a story is a.m. or p.m.

## Materials

- A teaching clock with geared hands for the board, with raised numbers (glued string or thick glue dots) so it can be felt.
- A card clock per pair with an hour hand and a minute hand fixed by a paper fastener. An adult fixes the fasteners before the lesson and tapes over the sharp ends on the back.
- Digital time cards in large print: 3:00, 3:30, 4:25, 7:40, 10:05, 11:55.
- Little Hill day cards, each with a picture, a sentence and a time: "Hen opens the bakery at 7:15 in the morning", "The bus leaves for school at 8:40 in the morning", "Lunch is ready at the market at 12:10 in the afternoon", "Mayor Hen rings the town bell at 3:25 in the afternoon", "The lamps on the bridge are lit at 6:45 in the evening".
- A minutes card per pair for support: a ring of 5, 10, 15 ... 60 to sit around the card clock, one number beside each clock number.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Point to each number on the teaching clock and count in fives together: 1 is 5 minutes, 2 is 10 minutes, and so on round to 12, which is 60 minutes or "o'clock". "The minute hand goes all the way round in one hour. Each number is 5 more minutes."

### ✎ Main activity (30 min)

1. **O'clock and half past (8 min).** "The short hand is the hour hand. The long hand is the minute hand." Set 3:00: the minute hand on 12, the hour hand on 3. Move the minute hand slowly round to 6 and show the hour hand moving too. "Half an hour has gone. It is half past 3, or 3:30. The hour hand is halfway between 3 and 4." Show the digital cards 3:00 and 3:30.
2. **Five-minute jumps (12 min).** Set 4:25 on the teaching clock. "The minute hand points to 5. Count in fives: 5, 10, 15, 20, 25. The hour hand has gone past 4 but is not yet halfway to 5. It is 4:25." Pairs set each time on their card clock and match the digital card: 7:40 (minute hand on 8, hour hand more than halfway from 7 to 8), 10:05 (minute hand on 1, hour hand just past 10), 11:55 (minute hand on 11, hour hand

almost at 12 but still 11 o'clock and some minutes). Partners take turns: one sets a time, the other reads it and writes it.

3. **a.m. and p.m. (10 min).** "There are two of every time each day: one in the morning and one in the afternoon or evening. Times from midnight until midday are a.m. Times from midday until midnight are p.m." Hand out the Little Hill day cards. Pairs set each time on the card clock, write it with a.m. or p.m., then the class puts the cards in order through the day:
    - 7:15 a.m. Hen opens the bakery;
    - 8:40 a.m. the bus leaves for school;
    - 12:10 p.m. lunch is ready at the market;
    - 3:25 p.m. Mayor Hen rings the town bell;
    - 6:45 p.m. the lamps on the bridge are lit.

### ✓ Discussion questions (with answers)

- How do you know which hand is which? The hour hand is shorter; the minute hand is longer.
- At 11:55, the hour hand is almost on 12. Why do we say 11:55 and not 12:55? The hour hand has not reached 12 yet, so it is still 11 and some minutes.
- Is lunch at 12:10 a.m. or p.m.? p.m., because it is just after midday.

### ✓ Closing check (10 min, with answers)

Set 2:35 on the teaching clock. "What time is it? Write it." (2:35.) "Show me 6:10 on your clock." (Minute hand on 2, hour hand just past 6.) "Goat reads a story before bed at 7:30. Is that a.m. or p.m.?" (p.m.) Note who reads the hour from the number the hour hand has just passed, and who reads the nearest number.

## Vocabulary

clock, hour hand, minute hand, o'clock, half past, minutes, a.m., p.m., morning, afternoon, evening, midday, midnight

## Differentiation

- **Support:** set only o'clock, half past, and times where the minute hand points to 1, 2 or 3 (5, 10 or 15 minutes past). Put the minutes card around the card clock.
- **Stretch:** "The bus leaves at 8:40. Hen arrives 10 minutes later. What time does Hen arrive?" (8:50.) Talk about "quarter past" and "quarter to" as other ways to say 15 and 45 minutes.
- Children who are blind or have low vision feel the raised numbers and the hands of the teaching clock or their card clock.

## ⚠ Safety

An adult fixes the paper fasteners and tapes over the sharp ends before the lesson. Never ask children about their own wake, meal or bed times; the times belong to the Little Hill characters.

## Teacher notes and misconceptions

- The most common mistake is reading the hour from the nearest number when the minute hand is past 30, so 9:50 is read as 10:50. Ask "Has the hour hand reached 10 yet?"
- Some children mix up the hands. Giving the minute hand a different colour and a different feel (a strip of tape along it) and saying "long hand, minutes" helps.
- Times exactly at 12:00 can confuse even adults (12:00 midday is often written 12:00 p.m.), so the lesson avoids them.
- Many children see more digital clocks than clocks with hands. Keep a clock with hands in the classroom and read it together each day.

# Lesson 4: Counting coins at the Little Hill market

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Back to the grade 2 year plan

About 45 minutes.

## Goal

Children name pennies, nickels, dimes and quarters and their values, find the value of a set of coins by counting on from the biggest, write amounts with the ¢ sign, and solve one-step story problems with made-up prices.

## Materials

- Card coins per pair, too large to swallow, printed on both sides with the value raised (glued string or thick glue) so it can be felt: 4 quarters, 6 dimes, 6 nickels and 10 pennies, plus one card dollar bill. Draw the coins in the same order of size as real coins (the dime smallest, then the penny, the nickel and the quarter).
- Little Hill market price cards with made-up prices (an example, not real prices): pear 35¢, ribbon 20¢, pencil 15¢, packet of seeds 50¢, toy kite 75¢.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

Count together in fives to 50 and in tens to 100, as in term 2. "Today we will use counting in fives and tens to count money."

### ✎ Main activity (30 min)

1. **Meeting the coins (8 min).** Show each card coin and say its value: a penny is 1 cent (1¢), a nickel is 5¢, a dime is 10¢ and a quarter is 25¢. A dollar is 100¢, written $1. Pairs sort their coins into four piles. "Which coin is the smallest?" (The dime.) "Which coin is worth the most?" (The quarter.) "Is the smallest coin worth the least?" (No: a dime is worth more than a penny or a nickel.)
2. **Counting a handful (12 min).** Model counting on from the biggest value: quarter, dime, dime, penny: "25, 35, 45, 46. That is 46¢." Pairs take turns to give their partner a set of coins to count, then try these together:
    - 2 dimes and 3 pennies (23¢);
    - 3 dimes, 2 nickels and 4 pennies (dimes 10, 20, 30; nickels 35, 40; pennies 41, 42, 43, 44: 44¢);
    - a quarter, a dime and a nickel (40¢);
    - 4 quarters (25, 50, 75, 100: 100¢, which is $1).

3. **The Little Hill market (10 min).** Put out the price cards. Pairs pay for each thing with card coins in one way, then find a second way (the pear, 35¢: a quarter and a dime, or 3 dimes and a nickel). Then story problems, solved with coins and written as a number sentence:
    - "Duck has 2 quarters and buys a pear. How much money is left?" (50¢ - 35¢ = 15¢.)
    - "Goat buys a packet of seeds and a pencil. How much is that?" (50¢ + 15¢ = 65¢.)
    - "Mouse has 60¢. The toy kite costs 75¢. How much more does Mouse need?" (75¢ - 60¢ = 15¢.)

### ✓ Discussion questions (with answers)

- Why do we start counting with the coin worth the most? It is quicker: big jumps first, then small ones.
- How many dimes make a dollar? 10, because 10 tens make 100.
- Can two children have different coins but the same amount of money? Yes: a quarter and a nickel is 30¢, and so are 3 dimes.

### ✓ Closing check (10 min, with answers)

Show 2 quarters, a dime and a penny. "How much money is this?" (61¢.) "Show me 30¢ in two different ways." (For example 3 dimes; a quarter and a nickel; 6 nickels.) "Hen has 50¢ and buys a packet of seeds. How much is left?" (0¢.) Note who counts on from the biggest coin and who counts every coin as 1.

## Vocabulary

penny, nickel, dime, quarter, dollar, cent, ¢, $, value, worth, price, cost, left, more

## Differentiation

- **Support:** use only dimes and pennies first, which works like tens and ones (3 dimes and 4 pennies is 34¢), then add nickels.
- **Stretch:** "Find all the ways to pay 25¢ with dimes, nickels and pennies if you use no more than 5 coins." (2 dimes and 1 nickel; 1 dime and 3 nickels; 5 nickels.)
- Children who are blind or have low vision feel the raised values on the card coins. Sorting by size alone does not work because the dime is the smallest coin.

## ⚠ Safety

Use card coins, not real coins: real coins are a choking risk and are handled by many people. Never ask children about family money, pocket money or what things cost at home; the prices belong to the Little Hill market.

## Teacher notes and misconceptions

- Many children think a bigger coin is worth more, so the nickel seems worth more than the dime. Keep asking "What is it worth?" rather than "Which is bigger?"
- Some children count every coin as one. Ask "How many cents is this coin?" before counting.
- These are United States coins. Schools in other countries should use their own coins and change the values and prices.
- Writing amounts with a decimal point ($0.42) is not taught here; amounts under a dollar are written with ¢.

# Lesson 5: Sides, corners and a shape bar graph

Unit overview - Previous: Lesson 4

Back to the grade 2 year plan

About 45 minutes.

## Goal

Children name triangles, quadrilaterals, pentagons and hexagons by counting sides and corners, say how many faces a cube has, put shapes together to make new shapes, and make and read a bar graph with four categories.

## Materials

- Card shapes per pair in different sizes and turned different ways: triangles, quadrilaterals (including squares, rectangles and some with no equal sides), pentagons and hexagons.
- Pattern blocks too large to swallow, per pair: 6 triangles, 2 trapezoids, 2 rhombuses (diamonds) and 1 hexagon.
- A cube per pair, such as a large wooden or foam block.
- A shape bag per pair holding exactly 19 card shapes: 5 triangles, 7 quadrilaterals, 3 pentagons and 4 hexagons.
- Squared paper (2 cm squares) and dot paper per child; card squares and glue for raised bar graphs. Small stickers for marking corners.
- A bar graph for the board, also made with raised card squares: boats on the Little Hill pond, with sailing boats 3, rowing boats 5 and canoes 2.
- Whiteboards and pens, or paper and pencils.

## Steps

### ✎ Opening (5 min)

"In grade 1 we found out what makes a triangle a triangle." Hold up a long, thin triangle and a square. "How did we know?" (Count the straight sides and the corners: 3 for a triangle.) "Today we count sides and corners to name more shapes."

### ✎ Main activity (30 min)

1. **Count and name (10 min).** Pairs take turns to pick a card shape, run a finger along each side while counting, then touch each corner. Name each group as it is found: 3 sides and 3 corners is a triangle; 4 sides and 4 corners is a quadrilateral (squares and rectangles are quadrilaterals too); 5 is a pentagon; 6 is a hexagon. "Does turning the shape or making it bigger change its name?" (No.) Then hold up the cube: pairs count its flat faces (6, all squares the same size) and its corners (8). Each child draws a shape with 5 corners on dot paper and a partner checks it is a pentagon.

2. **Making new shapes (8 min).** With pattern blocks: "Put 2 triangles together to make a shape with 4 sides." (A rhombus, which is a quadrilateral.) "Can you cover a trapezoid with triangles?" (Yes, 3.) "Can you cover the hexagon with triangles?" (Yes, 6.) "With trapezoids?" (Yes, 2.) Pairs lay the pieces on top of the hexagon to check, then count the sides of each new shape they make.
3. **A shape bar graph (12 min).** Each pair tips out its shape bag and sorts the shapes into four rows by name, one card for each shape, lined up at the left like a picture graph. Then they make a bar graph on squared paper: one square for each shape, filled in or covered with a card square, with the four names written along the bottom. Ask:
    - "How many shapes altogether?" (5 + 7 + 3 + 4 = 19.)
    - "Which shape is there least of?" (Pentagons.)
    - "How many more quadrilaterals than pentagons?" (7 - 3 = 4.)
    - "How many triangles and hexagons together?" (5 + 4 = 9.)

### ✓ Discussion questions (with answers)

- Is a square a quadrilateral? Yes: it has 4 sides and 4 corners.
- A shape has 6 sides but they are not all the same length. Is it a hexagon? Yes: it has 6 sides and 6 corners.
- Why do the bars start at the same line? So we can compare them fairly, just like lining up strips at one end before measuring.

### ✓ Closing check (10 min, with answers)

Hold up a pentagon with sides of different lengths. "What is this shape?" (A pentagon: 5 sides and 5 corners.) "Draw a shape with 4 corners. What is it called?" (A quadrilateral.) Show the boats bar graph. "How many boats altogether?" (10.) "How many more rowing boats than canoes?" (3.) Note who counts sides carefully and who names shapes by how they look.

## Vocabulary

side, corner, triangle, quadrilateral, pentagon, hexagon, cube, face, rhombus, trapezoid, bar graph, picture graph, altogether, how many more

## Differentiation

- **Support:** sort triangles and quadrilaterals first, then add the other shapes. Put a small sticker on each corner as it is counted.
- **Stretch:** count the edges of the cube (12). "How many triangles would cover 2 hexagons?" (12.)
- Children who are blind or have low vision feel the sides and corners of the card shapes and pattern blocks, and read the bar graph by feeling the raised card squares in each bar.

## ⚠ Safety

Use pattern blocks and cubes too large to swallow. Cubes stay on tables.

## Teacher notes and misconceptions

- Many children think a shape turned on its corner is a different shape (a square "becomes a diamond"). Turn shapes and ask "Did the number of sides change?"
- Some children only call a shape a hexagon if all its sides are the same. Show irregular hexagons often.
- Counting corners on a shape with many sides is easy to get wrong; touching each corner, or putting a small sticker on it, helps.
- Line plots, splitting rectangles into rows of squares, and halves, thirds and fourths are not taught in this unit (see Known gaps in the unit overview).